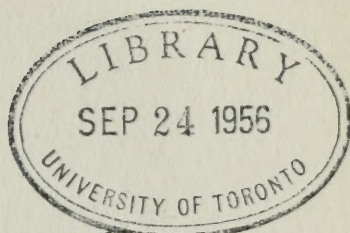


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Ship Canals from the Great Lakes to the Ocean

Address before the National Rivers
and Harbors Congress,
December 9, 1919


BY

GEORGE CLINTON

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SHIP CANALS FROM THE GREAT LAKES TO THE OCEAN.

Mr. President and Gentlemen:—

The occasion for this address is what is known as the Lenroot amendment to the Rivers and Harbors Bill, passed at the 3rd Session of the 65th Congress. That resolution, in substance, refers to the International Joint Commission for investigation, the question as to what further improvement of the St. Lawrence River between Montreal and Lake Ontario is necessary to make the same navigable for ocean-going vessels, together with the cost. The Commission is required to report to the Dominion of Canada and to the Congress of the United States, with recommendations for co-operation by those governments in the improvement of the River. It is to be noted that this amendment is worded in view of the fact that the Welland Canal is to be improved by increasing the depth to twenty five (25) feet, with thirty (30) feet over the miter-sills of the locks, which are to be eight hundred (800) feet in length and eighty (80) feet in width, thus making the canal adaptable for the passage of our largest lake vessels. The prism is to be so constructed that it can be deepened readily to thirty (30) feet. This, with the proposed improvement of the St. Lawrence River canals, would enable lake vessels to reach Montreal and the ocean from Duluth or Chicago, and, vice versa, from Montreal or the ocean to the heads of the Great Lakes. The amendment introduced by Mr. Lenroot was further amended by extending the field of investiga-

tion of the Commission to routes for a ship canal within American territory.

I assume that this Congress does not intend to depart from its established policy of not advocating any particular waterway improvement, but I regard it, nevertheless, as entirely proper that the question of a ship canal from the Lakes to the Ocean should be discussed, as it is one of the most prominent waterway questions before the Nation today.

In approaching the discussion I would premise that it presents several aspects. The great questions which are to be considered in determining the propriety of undertaking the construction of any such channel are of two classes, national and international. Also the subject has a sectional aspect, that is, to what extent the construction of a ship canal would affect, advantageously or disadvantageously, different sections of the United States, and this involves both the national and international character of the channel. Again, this vital question is presented, assuming that the advantages and disadvantages to different portions of the United States would warrant entering upon the enterprise, would the cost of construction and maintenance be so large, when compared with the advantages, as to make the building of the canal advisable, and this involves the subsidiary question whether such a canal would be used to any great extent by either lake or ocean going vessels.

Discussion of these questions must necessarily be from two points of view, first, the assumption that such a ship canal is feasible and would be commercially a success, and, second, that such a

canal would not be, on the other hand, feasible, and that it would not be a commercial success.

So far as the United States alone is concerned, a ship canal from the Great Lakes to the Ocean, if we assume that it would be used to an extent that would make it a commercial success, would be of great advantage for the shipment of the grain, ore, lumber and to some extent of manufactured products, from the northwestern and middlewestern states, as the tendency would be to minimize terminal charges and lower freights. Of course this would not be true if the canal was not a commercial success. On the other hand, if the canal should become an active and successful avenue of transportation, it would work most decidedly to the disadvantage of the states bordering the Mississippi south of Cairo, tend to prevent the great prospective growth of the commerce of the ports of New Orleans, Galveston and other Gulf ports, as well as those of the Atlantic ports, Baltimore, Philadelphia, Newport News and others. This result would inevitably follow, because rail, lake and river transportation of bulk freights and to a less extent of other freights, would be diverted from their present channels to the St. Lawrence route, with Montreal and European ports as terminals. A direct effect would also be to greatly injure the commercial prosperity of the great middle and eastern states, for the same reasons. Under these circumstances, it is a very pertinent question "Should the United States expend the moneys coming from the sections of the country last named for the purpose of aiding that section comprised in the northwestern and middle western states to the great injury of the Atlantic and the other Mississippi Valley states?" The

project is wholly in the interest of a section and against the interests of by far the most populous and prosperous part of the United States, exclusive of that section. We cannot preserve a patriotic unity in these United States if we are to indulge in improvements for the benefits of particular sections, where other sections of our country may be injured. We must be careful to adjust the application of the revenues of the country to expenditures which, while they will benefit particular sections, will not injure others and will be of general benefit to the entire country. Any other course will directly tend to dissension between the states and should not be tolerated. I may add that it would be gross injustice to enter upon any project which, while benefiting some states, would have to be principally paid for from the pockets of the inhabitants of the other states, which would either derive no benefit or whose prosperity would be actually injured. It would therefore seem that the question I have propounded should be positively and firmly answered in the negative.

Upon the assumption (which I shall hereafter show to be a false one) that a ship canal from the Great Lakes to the Sea would be a commercial success, the result would be that Great Britain and Canada would be the special beneficiaries. Freights drawn from the western and northwestern states, as well as from the upper Mississippi Valley, would either be delivered at Montreal or carried direct to foreign ports, instead of going south to the Gulf, to the Atlantic ports of the southern states, to the great ports of Virginia, Maryland and Pennsylvania or the great eastern ports of New York and Boston. This would build

up Canada and particularly its great port of Montreal, to the serious injury of all the Gulf and Atlantic ports of the United States. The result of this will be not only to divert commerce from the Ohio and Mississippi rivers, thus causing great injury to New Orleans and Galveston, but it will, by centering commerce in the Lake ports, directly divert it from all the southern and eastern Atlantic ports, as well as indirectly affecting the commerce of our Pacific ports. This will be disastrous to them, and the territory they represent.

This result is predicated upon the commercial success of the canal, but history and the incontrovertible facts prove that such a ship canal would not be used to any great extent by lake and ocean vessels. The result of construction would therefore be a great waste of money which would have to be contributed almost wholly by the States injured.

Shall we spend our money for such an altruistic purpose?

Certainly a project that would tend to have such results should be condemned by all our patriotic citizens. Freights not stopping at Montreal, but crossing the ocean, from their nature, nearly all go to Great Britain, thus giving that nation the benefit of the supposed lower freight rates on our products of the field, forest and mine. More than this, the great mercantile fleet of Great Britain would become an inevitable competitor for all our lake export trade. It would be a grand sight to see our lake ports crowded with British vessels taking on cargoes for Montreal or Liverpool. Not only would Great Britain profit by securing lower freight rates on our products, but she would be put in direct competition with our great trans-

portation business on the Lakes. This consummation devoutly to be wished by Canada and Great Britain would have no compensatory advantage to the citizens of the United States, except so far as the transportation and sale of the products of some of our states would be increased at less cost to the producers. It would seem that there should be no division of sentiment here and that all patriotic Americans should insist that we must not build up the prosperity of Canada and Great Britain at our own expense.

So far I have discussed the proposition under consideration upon the assumption for the purpose of the discussion, that a ship canal from the Great Lakes to the Ocean would be a commercial success. This assumption will not bear investigation in the light of practical experience, the difficulties and expense of the undertaking and the well known economic rules which govern transportation. Indeed, the construction of such a ship canal would be so great a failure commercially that it would not warrant the expenditure of anything like the amount that it would cost.

Connection of the Great Lakes with the Ocean has been the dream of many men in this country. It is still a dream, for the day of dreamers has not passed. As early as 1708 the connecting of Lake Erie with Lake Ontario, as a first step towards reaching the upper Lakes directly from the St. Lawrence and by that River reaching the Ocean, was suggested by Cadillac. The project was rejected by the Minister of Louis XIV as impracticable on account of its expense. That canal would have been the ship canal of those days, accommodating bateaux, carrying about five tons. The idea of overcoming the Falls and Rapids of

the Niagara by a canal was the subject of suggestion and agitation from time to time for many years. The principal result was the construction of the Erie Canal from the Hudson to Lake Erie, but the minds of some men still clung to the idea of utilizing the waters of Lake Ontario by a ship canal around the Falls and Rapids of the Niagara. The result was that in 1853 a charter for the construction of a ship canal around Niagara Falls was granted by the State of New York to Dean Richmond and others. A survey was made pursuant to this charter, the routes covered being practically the same as those suggested by the Deep Waterways Board of Engineers of the United States, as printed in its report of June 30, 1900. That canal would have been a ship canal for that day as it would have accommodated vessels of five hundred tons. The undertaking was, however, abandoned. The final outcome of all the suggestions, schemes and undertakings for connection between the Great Lakes and the Ocean by canal culminated in the rejection of all plans on the grounds of impracticability, lack of promise of commercial success and great cost, and the solution of water communication with the Ocean was found in the construction and subsequent improvement of the Erie Canal from the Hudson to Lake Erie, with a connection by way of Oswego between the Hudson and Lake Ontario, on the American side of the boundary, and on the Canadian side by the construction of the Welland and St. Lawrence River canals. Nevertheless the dreamers still had visions of a continuous ship waterway and, although it had been determined that the cheapest means of transportation was by lake vessels to Buffalo and by barge from Buf-

falo to tide-water, a board of engineers was appointed to again investigate the subject of a ship canal. This Board made a report in 1897, which was very incomplete, the principal recommendation being that thorough investigation, surveys and estimates of costs should be made. Accordingly, another Board of Engineers was appointed by the Government to undertake the work and it made a report in 1900. It proposed two or three different routes from the Niagara River, around the Falls and Rapids, to Lake Ontario and two principal routes from Lake Ontario to the Hudson, one by the way of Oswego and one down the St. Lawrence to Lake St. Francis and thence across Canada and the United States to Lake Champlain and the Hudson River. The expense was estimated at \$90,000,000 for the cheapest route, exclusive of administration. It is well to notice that one of the routes from Lake Ontario east suggested by the Board was wholly in American territory, but that the other was in Canadian waters and Canadian territory from St. Regis on the St. Lawrence to where the line struck the boundary of New York near Lake Champlain. This report has never been acted upon. The fact is that the idea of constructing a ship canal has been abandoned until renewed lately. It is also to be noted that the expense of construction estimated by the Board was arrived at from the cost of materials and labor obtaining at the end of the last century, and that after adding at least ten per cent. to the estimate for contingencies, the cost of administration and the increased cost of labor and materials, the expense would be today, at least \$400,000,000 for the cheapest route recommended. That at least ten per cent. should be

added to all engineers' estimates for such undertaking is proved not only by the cost of construction of the Panama Canal, but by the construction of the Barge Canals of the State of New York. The original estimate for those canals was nearly \$50,000,000, but more careful investigation increased this amount to \$90,000,000, and subsequent rises in labor and materials in the early part of this century caused further additions, bringing up the estimate to \$100,500,000, to which, to cover contingencies, \$500,000 was added, making the amount \$101,000,000. Unforeseeable contingencies in administration and construction arose so that in the end the barge canals cost \$128,000,000. The Cayuga and Seneca canals have cost \$7,000,000, but this was not included in the original barge canals improvement.

The solution of water transportation from the Great Lakes to the Sea, so far as keeping the route wholly within American territory is concerned, was therefore found, pursuant to previous investigations as to the cheapest methods of transportation, in utilizing the lakes and the construction of a canal that would float barges that will carry over two thousand tons and fleets of barges that will carry the full cargo of a lake vessel.

Canada a few years ago took up the question of securing the lake trade for Montreal by the construction of a canal, known as the Georgian Bay Canal, from the head of Georgian Bay by the way of French River, a series of small lakes and the Ottawa River, to that City. A large amount of money was spent by the Canadian Government in investigating this plan, together with extensive and minute surveys and the preparation of plans with estimates of cost. The result was investiga-

tion of the feasibility of constructing a ship canal connecting the head of Georgian Bay with Montreal, having twenty-five miles of artificial canals, eighty miles of dredging and three hundred and thirty two miles of waters improved by the construction of dams, making the total distance to Montreal, an ocean port, from Duluth 1056 miles, whereas by the Great Lakes and the New York barge canal the distance is 1480 miles to the ocean at New York, a saving of 424 miles. The expense was found to vary in accordance with the difference of cost between two of the entrances into the St. Lawrence at and near Montreal, but the variance was comparatively small and the estimated cost was about \$100,000,000. There were no great difficulties in this work and the saving in distance was great, nevertheless it was found the exigencies of navigation would cause in the end so great a loss of time in transportation, and the commercial and economic objections were so great that the construction of the canal has not been deemed warranted.

An alternative to the Georgian Bay Canal is the improvement of the Welland Canal so as to enable the largest lake vessels to proceed to and down Lake Ontario to Kingston for the transshipment of cargoes to barges that would pass the St. Lawrence canals which has a depth of fourteen feet over the miter-sills. This was determined by the Canadian Government to be the most feasible and cheapest route to Montreal. Accordingly, improvement of the Welland Canal has been undertaken, and although it has been delayed by the great war, it will be completed. The Welland canal will be twenty-five feet deep, with the walls so constructed that it can be readily deepened to

thirty feet. It will have thirty feet depth of water over the miter-sills of the locks, which will be eight hundred feet long and eighty feet wide in the clear. The depths of water are figured for extreme low water. The width of the canal will be two hundred feet at the bottom. Thus we find that the Canadian Government has abandoned the idea of a ship canal to Montreal and has adopted the principle simply of utilizing the waters of Lake Ontario for lake vessels, by the improvement of the Welland canal, and the use of barges on the St. Lawrence River and the St. Lawrence River canals.

Thus history shows that the idea of a ship canal all the way from Lake Erie to tide-water is a dream which is dissipated when resort is had to a careful investigation of the commercial element of cost of transportation. I may add that this conclusion has been come to after most thorough investigation, surveys and estimates and in view of the cost of transshipment from large vessels to barges. There are other commercial elements which enter into the problem which I shall discuss hereafter.

The result of the history of this movement is that further investigation of the feasibility and advisability of a ship canal from the Great Lakes to the Ocean is not necessary to determine whether such a ship canal should be constructed. Such an investigation probably would do no harm, but it has not been placed in the hands of a commission of the proper authorities, for the Joint International Commission is not properly equipped, either as to the personnel of the Commission or its means of investigation to give reliable advice on this subject, unless it be by the employment of

experts at tremendous expense. The Chief of Engineers, with the assistance of the Board of Engineers could make the investigation and furnish Congress with all the information necessary to come to a correct conclusion at comparatively small expense. International questions, such as negotiating with Canada, might properly be left with the Commission.

When considering the advisability of the construction of a ship canal from the Great Lakes to the Ocean, the first element to be considered is the cost. If the St. Lawrence route is to be adopted this cost will, of course, be apportioned or divided in some way between the United States and Canada and it will be the expense of improving the St. Lawrence canals or of canalizing the St. Lawrence River. Canada, as I have shown, has adopted as the cheapest means of transportation to Montreal, an ocean port, the Lake system to Kingston and Lake Ontario and thence by barges to Montreal, and beyond question neither the Dominion nor Great Britain could be induced to change that policy by providing a ship channel down the St. Lawrence, unless for the purpose of endeavoring to control our lake commerce and to furnish dominion over the Lakes by British war vessels in case of war.

What the cost of altering the St. Lawrence canals to ship dimensions would be has never been estimated, but it is certain that it will be extremely difficult and that the cost will be very great, running into the hundreds of millions. This is due to the topography of the River bank at the various rapids. The banks are not high and parts of the present canals have had to be protected by embankment or strengthening of the banks. Compe-

tent Canadian authority states that no estimate of cost has ever been made and no plan projected; that none can be without the most careful surveys. Already a private corporation has been formed in Canada to construct a ship canal from the head of Lake Superior to the Ocean. The main purpose is the development and use of electric power in Canada; the expense is estimated at \$500,000,000.00. Improvement by canalization of the St. Lawrence might be accomplished by the erection of dams at the foot of each rapid, but this would cost many millions of dollars, would flood extensive territories on the American and Canadian sides and would cause great damage by ice. This condition of affairs was gone into thoroughly at hearings before the International Waterways Commission when it was investigating the propriety of damming the Long Sault Rapids for power purposes, and it was found Canadian opposition was so strong that the Commission could not recommend the undertaking of the work, although the American Section rather favored it. The improvement proposed would have backed the waters of the St. Lawrence for about nine miles above the head of the rapids and would be one of a series of dams needed in case the stream was canalized for ship navigation. But the plans presented to the Commission for the dam at the foot of the rapids would not be adequate to create a ship channel and a higher dam would have to be erected and the levels of the water above it would have to be raised several feet. I think it may be almost taken for granted, that unless influenced by the motives I have stated above, Canada will not consent either to the construction of ship canals around the Rapids or to the canalization of the River.

In any event, why the Government of the United States should participate in the expenditure of an immense sum of money which would redound almost entirely to the benefit of Canada and Great Britain is impossible to see. Our people are over-taxed now and they ought not to be called upon for money to benefit a few states and our competitors for the trade of the Great Lakes.

An element necessary to an undertaking of the project is the available routes. I say the "available" routes, because previous surveys have pointed out what routes for topographical and economical reasons could best be adopted. One of these is the Canadian route, of which I have spoken, the improved Welland Canal, Lake Ontario and the improvement to ship size of the Canadian canals or the canalization of the St. Lawrence River. This route is wholly Canadian. The other routes are those described in the report of the Deep Waterways Board of Engineers. Starting from the Niagara River a ship canal would be constructed around the Falls on the American side. This would now seem to be unnecessary as the Welland canal is to be improved. Lake Ontario would then be utilized as far as Oswego and from Oswego a ship canal would be constructed up the Oswego River, connecting with Oneida Lake, which would be deepened, thence using the Mohawk route to the Hudson. As an alternative, the route would proceed down Lake Ontario and the St. Lawrence to Lake St. Francis, and from near the foot of Lake St. Francis across Canadian territory to the boundary line of New York State near Lake Champlain, and thence to the head of Lake Champlain and on down to the Hudson. It will be observed that the line of the first mentioned route would be in Canadian territory to Lake Ontario, if the Welland Canal was used, and in American territory if a new canal around the

Falls was constructed on the American side. If the Oswego route was adopted it would be entirely within American territory through and from Lake Ontario. If the Champlain route were adopted it would be almost entirely in Canadian territory until the boundary line of New York near Lake Champlain was reached. Thus, on the Champlain route for about two hundred miles, navigation would be in and under the control of Canada, except the comparatively short distance around the Falls if a ship canal to Lake Ontario were constructed on the American side. I have already discussed the cost of these routes, which undoubtedly today would be over four hundred millions of dollars, more, when land purchase and damages are added.

The question suggests itself here whether the advantages of such a ship canal on either of these routes or on the St. Lawrence would outweigh the disadvantages. It is quite certain that no patriotic American would consent to place the control of navigation between the Ocean and the Great Lakes in the hands of Great Britain and Canada, either wholly or partially. If the St. Lawrence route is adopted that control is wholly within their power. If the Champlain canal route is adopted it is within their power from a point near the head of Lake Champlain and it would be comparatively easy for Canada to complete ship navigation by canal from the foot of Lake St. Francis to Montreal, which is but a few miles, and thus obtain absolute control of the commerce of the ship canal to the Lakes as against the Champlain-Hudson route from the head of Lake Champlain.

The remaining question is whether a ship canal would be warranted by the advantages as against the cost and its commercial utility. Study of this question makes it quite apparent that the expenditure of money would be largely wasted if a canal

upon any of the routes was constructed, and it is certain that the commercial advantages would not be at all commensurate with the expenditure. Consideration of these propositions involves a study of the water conditions on the Great Lakes, economical transportation on the Great Lakes and economical transportation on the Ocean, as well as the objections to the St. Lawrence route.

There are serious objections to the use of the St. Lawrence River from Montreal to the Ocean for navigation by ocean or lake vessels. These objections have been considered time and again and they have been the most serious handicap to the growth of Montreal as a great seaport. We all know that Montreal does not compare with New York as a commercial port, and we all know that it has no prospect of ever successfully competing with New York commercially. These objections are the violent cross-currents in the Gulf of St. Lawrence and the heavy fogs and ice which not only make navigation extremely dangerous, but which actually raise insurance rates to a point that tells heavily against the commerce between Montreal and foreign countries and has told heavily against it in the past.

Consideration of the conditions of the Great Lake waters has been taken up by the War Department in connection with a proposed improvement by the United States of the St. Lawrence River from Lake Ontario to the Canadian border, with a view to providing navigation facilities suitable for ocean-going ships. In 1917 the Rivers and Harbors Act directed a preliminary examination of Lake Ontario and the St. Lawrence River, with a view to the improvement stated. The examination was made in 1918 by Col. J. G. Warren of the

Corps of Engineers, and his report, dated April 12, 1918, was thoroughly considered by the Board of Engineers, approved by them and submitted to the Chief of Engineers, whose approval of the report, with all documents and communications, were submitted to the Secretary of War, who transmitted them to the House of Representatives December 16, 1918, as appears from Document No. 1591 of the 3rd Session, 65th Congress. The report and the approvals all declare that the improvement of the St. Lawrence from Lake Ontario to the Canadian border, with a view to providing navigation facilities suitable for ocean-going ships, is not deemed advisable at the present time. Colonel Warren and the Board of Engineers considered various projects and give cogent reasons for not recommending the improvement, and among other things they state that even with a ship channel from the international boundary line on the St. Lawrence to the Ocean by the Champlain-Hudson River route, or by the enlargement of the Soulanges, Lachine and other canals on the St. Lawrence route, the traffic would still be governed by the depths of the harbors and connecting waters of the Great Lakes, and they refer to House Document No. 755, 65th Congress, 2nd Session, for data on this subject. As appears from that document, the deepening of the harbors and connecting waters of the Great Lakes to twenty-five feet, even, was reported upon unfavorably on the ground that traffic existing and prospective would not warrant the expenditure. It is to be noted here that deepening the harbors and connecting waters of the Great Lakes to twenty-five feet would not be sufficient to permit ocean vessels of a capacity compared to that of our lake vessels

to navigate the lakes and enter the lake harbors and that our lake vessels are not adapted to ocean navigation. We thus have the opinion of the Board of Engineers and the Chief of Engineers that the deepening of the harbors and connecting waters of the Great Lakes and the construction of a ship canal to the international boundary is not warranted by the present or prospective commercial conditions, even though the ship canal should be continued to the Ocean. The conclusions of these officials were arrived at only after the most careful consideration of cost, hydraulic, topographical and engineering elements, as well as commercial conditions. It is pertinent to ask why further expenditure of money should be indulged in when all the necessary data are at hand and come from authoritative sources. It is safe to say that over a million dollars has been expended in just such investigations and that in the hands of the Joint International Commission, if another thorough investigation is made, the expenditure would duplicate that already made, with similar results.

There is another aspect of the economic question involved which is wholly one of navigation. Great Lake vessels are practically hollow boxes, constructed for the purpose of carrying the largest cargoes possible on the lowest draft of water on inland lakes and connecting waters, construction being adapted to the comparative safety of inland navigation and the shortness of the season, which averages seven months. Lake vessels must carry as large cargos as possible and make as many trips as possible on the Great Lakes to earn the largest profits. They average in speed twelve miles an hour on the open waters and nine miles

on the connecting waters, and they can make, at an average of ten miles an hour, the trip from Duluth to Buffalo in about four days and from Chicago to Buffalo in about three and one half days. In the narrow channel of ship canals, with the delay of lockage, those boats could not make safely more than about four miles an hour. The delay at locks may be illustrated by the use of those at Sault Ste. Marie. The average delay is an hour and a half. In the past, before the construction of the third and fourth locks, within my personal experience, vessels have been delayed fourteen hours. If the traffic on the ship canal is at all great, the average delay at each lock would certainly be an hour and a half, and as there would be at least thirty locks to overcome the difference of the levels of Lake Erie and the St. Lawrence at Montreal (573 to 18 above tide-water) nearly two days would be wasted in passage one way, nearly four days on the down and return trip. This calculation is on the basis of the system of canals and lockages around the rapids of the St. Lawrence and the reduction of the number of locks by the new Welland. The total number of locks might be reduced to about twenty with a loss of time to vessels of a day and a half, on the average, for each trip. If the St. Lawrence is canalized the expense will be tremendous, but the locks can be reduced in number to eleven or twelve, making, with the seven locks of the New Welland, eighteen or nineteen lockages on the route from Lake Erie to Montreal. If such vessels navigated a ship canal to Montreal, the loss of time between Lake Erie and Montreal would involve so great a loss of earnings that the trade would not even attract our lake vessels, unless freights were raised to a

point that would far exceed the cost of transfer at Buffalo and carriage by the Erie Barge Canal and the Hudson River to New York. If such vessels undertook to pass Montreal and proceed, we will say to Liverpool, they would be at the mercy of the storms of the Atlantic, which they are not fit to encounter, and their comparatively low power would not make them successful competitors of ocean vessels carrying from the Atlantic ports of our country. In addition to this, the higher rates of insurance of vessels and cargos on the lower St. Lawrence would add a burden that would be almost destructive of transportation by lake vessels from the Lakes to Europe. If our lake vessels delivered their cargos at Montreal they would suffer a further loss, inasmuch as from that port they could not get the return cargos which they now do from Lake Erie ports, and they would have to take partial cargos, if any, through the ship canals and the increased distance across Lake Erie at a dead loss. The expense of these vessels is about \$500 a day and they must make as quick trips as possible with as large cargos as can be had, both up and down the Lakes, and they cannot spend time going to Montreal or encountering the dangers of the ocean in competition with ocean vessels.

It is interesting to recall that this experiment of navigation to Montreal by Lake vessels via the Welland and St. Lawrence canals has been tried in the past but abandoned as too expensive. Lake vessels now deliver at Kingston, where transshipment is made to barges. Even this method of reaching tide-water is more costly than transportation by Lake vessels to Buffalo or Oswego

and thence by the New York Barge Canal system, and therefore the Canadian route takes but a small percentage of the Great Lakes traffic.

The use of the St. Lawrence route during the late war furnishes no test of commercial success. There was no use of the route by large commercial Lake vessels, cost of transportation was not considered and investigation will show that it was too excessive to warrant use by Lake vessels for commercial purposes.

We may now consider ocean vessels from the point of view of utilizing the waters of the St. Lawrence River to the harbors on the Great Lakes. A typical ocean carrier, with a tonnage of ten thousand, is comparable to our largest lake vessel. It has a draft of over twenty-seven feet and a cargo capacity of about three hundred and fifty thousand bushels of wheat; its speed is about twelve miles an hour. The obtaining freights on grain, New York to Liverpool, is today seventy to eighty cents per hundred pounds, or between forty and fifty cents a bushel. The owners of such vessels would most certainly not engage in traffic between Montreal and the harbors of the Great Lakes for the reason that their ocean rates are so far above lake rates that they could not compete with lake carriers on the lakes without a great reduction of their own rates. It would be much more to their advantage to deliver at Atlantic ports in the United States and much more to the advantage of shippers to ship to such ports even by rail, certainly by the Great Lakes, the Barge canals and Hudson River to New York. Ocean vessels (as well as lake vessels) could not navigate a ship canal even thirty feet deep with any safety, without limiting their speed to as low as four miles

an hour, in view of the danger of grounding, danger of sheering and danger of collision with the banks and in view of delays at the locks. In addition, ocean vessels require a greater number of skilled officers and a much larger crew than Lake vessels, and their expenses are excessive; they cannot afford to navigate long, narrow channels and shallow waters.

It is impossible to imagine an ocean vessel undertaking the trip by way of the Gulf of St. Lawrence, Montreal, the River St. Lawrence, Lake Ontario, St. Lawrence canals and the Welland canal in order to reach the upper Great Lakes. It is absurd to think of such vessels navigating the many miles of ship canal by the Mohawk and Oswego route or the Hudson-Champlain route, in order to reach the St. Lawrence or Lake Ontario, and thence proceeding across Lake Ontario and through a ship canal around the Falls. Ocean vessels will not engage in the business of the Great Lakes because they cannot do so without sacrificing earnings and incurring unnecessary dangers of navigation in narrow and inland waters; they certainly cannot engage in commerce on the Great Lakes unless the connecting waters and the harbors are deepened to at least thirty feet, something which is not to be expected since the proposition to deepen to twenty-five feet has been rejected by the War Department and the Board of Engineers as not warranted by any present or prospective conditions of commerce.

The result at which we arrive is that the commerce from Lake Erie to the Ocean via any of the ship canal routes, would not reach an amount that would have an appreciable effect upon the contin-

uance of the present methods of doing business upon the Great Lakes. It follows that the expenditure of hundreds of millions of dollars in the construction of a ship canal would practically be a waste of money.

The international questions involved in the subject we are discussing are of paramount importance. If we assume that the proposed ship canal will be a success, it is quite apparent, as I have already pointed out, that Great Britain and Canada will become dangerous competitors for the entire trade of the Great Lakes in connection with ocean transportation. That British and Canadian competition would be largely successful, and to that extent dangerous to the business of those engaged in our lake transportation and to our ship-building interests on the Great Lakes, cannot be questioned, for the ability of Great Britain, with her mercantile marine and her ability to build vessels cheaply, would assure to her and Canada a large proportion, to say the least, of the lake export and import carrying trade.

More important still, from the international point of view, is the fact that a ship canal through Canadian waters, by the St. Lawrence or St. Lawrence-Champlain-Hudson routes, would give Great Britain absolute control of our Great Lakes in case of war or diplomatic difficulties, by placing her destroyers upon the waters of the Great Lakes. The United States could not utilize the canals for this purpose as they would be within Canadian territory. Neither could the United States prevent their use by Great Britain, under ordinary circumstances, because if disputes arose between Great Britain and the United States, British destroyers could be placed upon the Great

Lakes within a few days from Montreal. The United States would be helpless to prevent this, for it is to be assumed that Great Britain would take the initiative without waiting for us to mobilize and invade Canada to prevent the subjection of our Great Lakes ports to Britain's navy. Thus any ship canal, except by the Oswego route, would continually exist as a menace, would fortify contention of Great Britain against the United States and would enable Great Britain to exercise coercive powers by placing our Great Lakes ports under the guns of her navy. There would be no defensive offset except to regard our lake coasts as open to Great Britain and to fortify them in the same manner and to the same extent as our Atlantic, Pacific and Gulf coasts. This is not mere speculation. The danger of placing vessels of war upon the Great Lakes was recognized by the statesmen of this country in the past and it was provided against by treaty. In 1817, by exchange of notes between the United States and Great Britain, an agreement was arrived at in relation to naval vessels on the Great Lakes, by which neither power was to maintain a naval force thereon exceeding one vessel on Lake Ontario and two vessels on the other lakes, such vessels not to exceed one hundred tons burthen and to be armed with only one eighteen pound cannon. This agreement was ratified April 16, 1818, and proclaimed by the President on the 26th day of that month.

At the late Convention of the National Rivers and Harbors Congress one speaker for the canal dramatically announced that he would "puncture that bubble", referring to the danger of British war vessels invading the Lakes. He proceeded to

puncture by stating that the canal could be destroyed by artillery in time to prevent British war vessels utilizing it. This would be true if heavy enough guns with proper emplacements were placed at points within range and kept there to meet contingencies. It is true that this would be an unfriendly act likely to excite irritation on the part of Canada, but it would be necessary because in case of trouble threatening rupture, or if Great Britain sought to coerce the United States, sufficient war vessels could be placed on the Great Lakes in so short a time that destruction of the canal would only prevent temporarily their return to the Ocean. We would have to be continually prepared for such an invasion, thus continually threatening Canada. The argument amounts to advocating the construction of a means adapted to give Great Britain and Canada a tremendous advantage for war or coercive purposes and then to defend ourselves. It is like suggesting that because we have a shotgun in the house we should leave the front door open, because if burglars entered we could use the shotgun. The argument of the gentleman did not "puncture the bubble".

The danger of opening the way to Great Britain for naval supremacy on the Great Lakes has been sneered at by some of the western papers, but their editorials disclose nothing more than ignorance and shortsightedness. We must look to the future, for the international affairs of nations are always changing and international relations in the future can never be foreseen. A League of Nations and arbitration treaties are positively of no effect as preventing aggression and war when a powerful nation regards its honor as attacked or the prosperity of its people threatened by some

other nation. We are at peace with Great Britain today, but a quarter of a century hence conditions readily may arise to cause hostility and a resort, perhaps, to reprisals, coercion or war. We must always look to the coming years and must not for fancied commercial advantage subject ourselves to a position of danger from the action of any other power.

At the Rivers and Harbors Congress, Mr. Vogelsang delivered a partisan, non-partisan, pseudo scientific address devoted to the tremendous advantage to the United States of the development of electric power on the St. Lawrence. If the St. Lawrence canals are improved the electric power will be generated entirely in, and belong to, Canada. If the St. Lawrence is canalized the only point before the boundary line is reached at which electric power can be generated in any quantity is at the foot of the Long Sault Rapids, where perhaps 800,000 h. p. might be obtained. Of this the United States would get probably 400,000 h. p. which would be utilized in the State of New York. This would not diminish the consumption of coal in that state because every unit of power would be utilized in addition to the use of the same amount of coal now utilized for power purposes. The industries of the State for full development would require this additional power and much more. The coal situation would not be affected. Below the foot of the Long Sault all power developed would be within the Dominion of Canada and would be utilized there, if not now, eventually.

It is said that the electric power developed would pay the expense of canalizing the St. Lawrence or improving the River canals. This is absolutely untrue. No reliable estimate of the cost

has ever been made and there can be no possible doubt but what the erection of the necessary number of dams and locks, together with the payment of land and other damages from flooding and ice jams would far exceed any return which the United States would get.

TO SUM UP:

1. It is entirely certain that the expenditure of an immense amount of money in a new investigation as to the feasibility of construction of a ship canal to the Ocean is not necessary and not warranted, because sufficient data to determine that question already exists. The conclusion could be arrived at by the War Department, for the advice of Congress, with full data, at comparatively little expense.

2. A ship canal by any of the routes suggested which could be adopted would not be a commercial success.

3. If such a ship canal should be a commercial success it would redound to the advantage of a few states and great injury to the southern, southwestern, middle and Atlantic states.

4. If a ship canal to the Ocean were a commercial success it would introduce Great Britain and Canada as a dangerous competitor for the Great Lakes traffic.

5. The construction of a ship canal that by any possibility might be utilized to a sufficient extent to warrant the expenditure of the necessary money would necessitate the United States con-

tributing our funds and the levying of taxes upon our people for the aggrandizement of Canada and Great Britain.

6. The construction of any feasible ship canal would necessitate its being almost wholly in Canadian territory and would place the United States in a helpless condition in case of the outbreak of war or the rupture of diplomatic relations, so far as naval domination of the Lakes is concerned, and, in case of rupture between Great Britain and the United States, would make it entirely within the power of Great Britain to place the great ports of Buffalo, Cleveland, Detroit, Chicago and Duluth-Superior City under the guns of British destroyers.

7. There would be no saving of coal by reason of the production of electric power, and almost all of the power developed would go to Canada.

From every point of view, if an investigation is to be made, it should be placed in the hands of the War Department, and it is certain that a ship canal from the Great Lakes to the Ocean should not be constructed. Careful consideration of known facts will dissipate the dream of a Great Lakes to the Ocean ship canal.

Dated January 12, 1920.

GEORGE CLINTON.

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